Space Weather Forecast

Issued on Thursday, 28 April 2022 at 12:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1/Minor Storms Likely 29th and 30th, chance of G2/Moderate Storms 30th. Chance of Moderate-class flares (R1/R2 Radio Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, with several Common-class flares observed, the most recent an upper level Common-class flare from a decayed sunspot group in the northwest quadrant at 28/0306 UTC. An associated CME was observed and appears directed off the Sun-Earth line, with analysis pending to confirm this.

There are currently eight numbered sunspot regions on the visible disc. AR2994 in the far northwestern quadrant remains the most complex. The remaining sunspot groups are all rather simple with small magnetic regions, or are benign alpha spots.

Several other coronal mass ejections have been observed, with one originating from an upper common class flare at 1450UTC on 27th currently expected to be Earth directed, with arrival on 30th April. A prominence eruption was observed off the southeast limb, beginning around 28/0300UTC, with the associated CME looking directed off the Sun-Earth line. However, analysis will be conducted as more imagery becomes available to confirm this.

Solar Wind / Geomagnetic Activity: The solar wind increased from slightly elevated to elevated around 27/1200UTC likely indicating the arrival of a CME. The Interplanetary Magnetic Field was mostly weak but with an initial short period of moderate. The north-south component followed a similar trend, with an initial extended period of negative polarity, peaking at moderate levels. Geomagnetic activity started at G1/Minor Storm interval (Kp 5) 27/1200-1500UTC, then became Unsettled to Active (Kp 3-4) thereafter.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low, with a chance of Moderate activity and a very slight chance of High activity.

Solar Wind / Geomagnetic Activity: Current modelling suggests the arrival of a coronal mass ejection which left the Sun around 27/1450UTC, early on 30th April. Solar winds are expected to be slightly elevated to elevated speeds through 28 April with a slight decreasing trend. Speeds are then forecast to increase to elevated either late on 28 April or more likely on 29 April due to the onset of the high speed stream from Coronal Hole 78. Speeds may then increase further at the CME arrival early on 30th. Speeds will then likely decrease later on 30th or 1st May back to slightly elevated. Geomagnetic activity is forecast to be mainly Quiet to Unsettled on 28th with a chance of Active intervals. Activity will then likley increase to Unsettled to Active on 29th with a

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chance of G1 Minor Storm intervals. Early on 30th April the geomagnetic activity will likely increase to G1/Minor Storm, with a chance of G2/Moderate Storm intervals before easing back to Quiet to Active later on 30th and during 1st May.
Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to remain at background levels with no solar radiation storms occurring.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	20	40	70	10
Strong	G3	No	1	1	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	25	20	20	10
Very Active	R3 to R5 X	No	5	5	3	3

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	5	2	2
Very Active	**≥ S3 ***	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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